INL News Release
FOR IMMEDIATE RELEASE
September 14, 2009

NEWS MEDIA CONTACTS:
Mike Wall, 208-526-0490, michael.wall@inl.gov
John Lindsay, 208-526-9078, john.lindsay@inl.gov

Advanced Test Reactor National Scientific User Facility chooses two new projects

IDAHO FALLS -- Two new research teams have been selected to perform experiments with the Advanced Test Reactor (ATR) National Scientific User Facility (NSUF) at the U.S. Department of Energy's Idaho National Laboratory. The NSUF program grants university-led scientific groups free access to the ATR—one of the world's premier research reactors—and other resources at INL and affiliated institutions.

Scientists from Idaho State University will lead one of the new experiments, and Drexel University will helm the other. The two projects, chosen from a pool of 15 applicants, bring the number of current User Facility experiments to 12. Six other projects were selected in 2008, the first year of awards, and four more were added in February 2009.

The ISU team is led by George Imel, chair of the university's Nuclear Engineering Department, and physicist Jason Harris. They will work with collaborators from INL and France's Commissariat a l'Energie Atomique to evaluate neutron detectors and other instruments that monitor nuclear reactor cores. The scientists will conduct their experiments in INL's Advanced Test Reactor Critical (ATRC), a low-power mock-up of the ATR. It is the first User Facility project to use the ATRC.

"Nuclear scientists always want better reactor instrumentation, and this project could help us achieve that goal," said INL's Todd Allen, scientific director of the User Facility. "And we're also excited that the User Facility is expanding to use the ATRC for the first time."

In the other experiment, scientists from Drexel University and the Savannah River National Laboratory will investigate how a new class of materials holds up under extremely high temperatures and radiation loads. The researchers will employ the ATR to evaluate the suitability of these compounds—ternary carbides and nitrides—as building materials for structures deep within nuclear power plants.

"This project is a good example of why we came up with the User Facility," Allen said. "This team has created a new type of material, but you need somewhere to test such ideas out."

He said the Drexel-led experiment also exemplifies another purpose of the User Facility: drawing expertise into the nuclear energy field from a variety of backgrounds. The principal investigator is Drexel's Michel Barsoum, a materials scientist rather than a nuclear engineer.

"Engaging new people with different perspectives is key," Allen said.

Both research groups will work with INL scientists to design their experiments before beginning operations in the test reactors. While the ISU team will have the ATRC pretty much to itself, Drexel's project will join a few others in the ATR. Five User Facility experiments are in the reactor now, with two more slated to go in soon.

The ATR is in such demand in part because it can accommodate all of these experiments, and many more, simultaneously; its unique design enables operators to subject each project to vastly different conditions. Further, the ATR can generate extremely high neutron levels, allowing engineers to gauge in mere months how a test material might hold up after many years inside a commercial nuclear reactor.

The new awards bring two new universities into the User Facility program, increasing the total to 10. The others performing experiments are: the Colorado School of Mines, the Massachusetts Institute of Technology, North Carolina State University, the University of California-Santa Barbara (two projects), the University of Florida, the University of Illinois, the University of Wisconsin-Madison (two projects) and Utah State University.

The User Facility holds a rolling proposal solicitation with two closing dates every year. The next closing date is Oct. 15, with the following one in April 2010.

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-INL- 09-043

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